

REMARKS

In accordance with the foregoing, claim 2 is amended. Claims 1 - 20 are pending and claims 1 – 5, 7 – 12 and 14 are currently under consideration. No new matter is presented in this Amendment.

REJECTIONS UNDER 35 U.S.C. §112:

At page 2 of the Office Action, claim 2 was rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The Examiner alleged that the meaning of the phrase “approximately less than” in this claim is unclear and requested clarification.

Claim 2 is amended herein to delete the term “approximately.” It is respectfully submitted that the amended claim is definite. Therefore, the rejection should be withdrawn.

REJECTIONS UNDER 35 U.S.C. §102:

At page 3 of the Office Action, claims 1 and 8 were rejected under 35 U.S.C. §102(b) as allegedly being anticipated by Harris et al. (U.S. Patent 4,952,465). The Examiner alleged that Harris discloses a device for absorbing hydrogen and recombining oxygen (which the Examiner alleged is a fuel cell), including a positive electrode, a negative electrode, an electrolytic membrane and a separator disposed between and in contact with one of the electrodes and including an amorphous metal alloy.

For the following reasons, this rejection is respectfully traversed and reconsideration is requested.

Independent claim 1 is directed to a separator of a fuel cell, the separator comprising a solid-state, amorphous alloy. Independent claim 8 is directed to a fuel cell, comprising an anode; a cathode; an electrolyte membrane disposed between the anode and the cathode, being on a first side of the anode and the cathode; and at least one separator proximate to one of the anode and the cathode, the separator being disposed on a side of the anode/cathode opposite to the electrolyte membrane, and comprising a solid-state, amorphous alloy.

Contrary to what is alleged by the Examiner, Harris et al. does not describe a fuel cell and does not describe a separator of a fuel cell. Rather, Harris et al. relates to an electrochemical energy storage device, i.e., a battery, in which hydrogen and oxygen are incidental and unwanted by-products, and to an additive to the electrochemical energy storage

device that absorbs and reversibly stores hydrogen and facilitates the recombination of oxygen (col. 5, lines 15 – 19 of Harris et al.) to prevent the build-up of pressure in a sealed battery. (What Harris et al. refers to as “recombination of oxygen” is the conversion of oxygen into hydroxyl ions (col. 3, line 33)).

This difference is significant because the term “separator” has a different meaning to persons skilled in the art of battery technology than it does to persons skilled in the art of fuel cell technology. In particular, in Harris et al., the term “separator” refers to an electrolyte-infused material that electrically insulates the anode from the cathode of the battery. See, for example, separator 4 of FIG. 1 of Harris et al. and the description thereof at col. 9, lines 30 – 31, the separators 14a and 14b of FIG. 2 of Harris et al. and the description thereof at col. 10, lines 7 – 13 and the separator 24 of FIG. 3 of Harris et al. and the description thereof at col. 10, lines 35 – 38. From these descriptions, it is apparent that what is meant by a “separator” in Harris et al. is akin to what is referred to as the electrolyte membrane in fuel cell technology.

In fuel cell technology, on the other hand, the term “separator” is understood in the art to refer to a nonporous structure such as a bipolar plate or separator interposed between adjacent unit cells, an end plate, or a cooling device, etc. Harris et al. does not teach or suggest any feature that would be considered a separator of a fuel cell, as that term is understood in fuel cell technology.

Moreover, even in the context of the energy storage devices described in Harris et al., Harris et al. does not describe a separator that is made of a solid-state, amorphous alloy. The closest to this is the button battery of FIG. 2, referred to by the Examiner, wherein the alloy additive of Harris et al. is sandwiched as a particulate layer between two separator layers. The composition of the layers 14a and 14b that make up the separator is not specified. (In the embodiments of FIG. 1 and FIG. 3 of Harris et al., the alloy additive material is not related to a separator of any kind at all.) Therefore, even with respect to the embodiment of FIG. 2, Harris et al. does not describe that the separator itself comprises the alloy additive.

Accordingly, Harris et al. does not teach or suggest a separator of a fuel cell, the separator comprising a solid-state, amorphous alloy.

Moreover, Harris et al. does not teach or suggest a physical structure of a fuel cell as required by claim 8. In addition to the lack of teaching of a separator of a fuel cell, as discussed above, it should also be noted that Harris et al. does not describe any structure having both an electrolyte membrane disposed between the anode and the cathode and at least one separator on the other side of the anode or cathode opposite to the electrolyte membrane.

Therefore, claims 1 and 8 are not anticipated by, and would not have been obvious over Harris et al.

Therefore, the rejection should be withdrawn.

REJECTIONS UNDER 35 U.S.C. §103:

At page 3 of the Office Action, claims 2 - 5, 7, 9 - 12, and 14 were rejected under 35 U.S.C. §103(a) as being unpatentable over Harris et al. (U.S. Patent 4,952,465) in view of Peker et al. (PG Pub, 2003/0062811).

The Examiner alleged that Harris et al. discusses that the amorphous alloy may be an iron-base alloy. The Examiner acknowledged that Harris et al. does not disclose the specific alloys recited in claims 7 and 14 or the properties recited in claims 2 – 4 and 9 – 11. The Examiner alleged that Peker et al. indicates that the alloys recited in the instant claims are suitable materials to be used as part of a metal frame to be used to at least partially encase at least one electronic component and indicates that such materials possess the fracture toughness and elastic limit values as recited in the present claims 3, 4, 10 and 11. The Examiner alleged that the corrosion properties of the Peker alloys would be within the limits of claims 2 and 9. The Examiner took the position that it would have been obvious to employ the alloys of Peker et al. as the amorphous material of Harris et al., given the desirable properties of these alloys as detailed by Peker et al.

For the following reasons, this rejection is respectfully traversed and reconsideration is requested. As discussed above, Harris et al. does not teach or suggest a separator of a fuel cell and does not teach or suggest a fuel cell including a separator of a fuel cell. Pekar et al. relates to an alloy metal frame or housing for electronic components and contains no teachings that are relevant to a separator of a fuel cell. Pekar et al. does not overcome the failure of Harris et al. to teach a separator of a fuel cell or a fuel cell including a separator as recited in the present claims. Therefore, the rejection should be withdrawn.

REQUEST FOR REJOINDER AND ALLOWANCE OF WITHDRAWN CLAIMS

Applicants hereby request the rejoinder of claims 6, 13 and 15 – 20 for the following reasons:

Withdrawn claims 6 and 13 relate to non-elected species. Since generic claims 1 and 8 covering these species are allowable, as discussed above, claims 6 and 13 should be rejoined and allowed.

Withdrawn claims 15 - 20 relate to a method of manufacturing a separator of a fuel cell, the separator comprising a solid-state, amorphous alloy. The claims require all of the limitations of claim 1, which is allowable, as discussed above. Therefore, Claims 15 - 20 should be rejoined and allowed.

CONCLUSION:

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

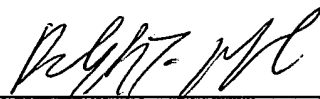
Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 503333.

Respectfully submitted,

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